

Daniel Hernandez Villanueva

Section: P22

2) Number: 11838779

Group #: 8

Question:

Date: May 9, 2020

$$\omega = (57^2 + 2) \text{ rad/s}$$

1) Determine:

a) v

b) $a = \sqrt{a_t^2 + a_n^2}$

$$R_{\text{rot}} = 0.86 \text{ s} \quad \text{and} \quad r = 35 \text{ cm}$$

$$\omega = 5.698 \text{ rad/s}$$

$$v = r\omega = 1.9943 \text{ m/s}$$

$$v = 1.99 \text{ m/s}$$

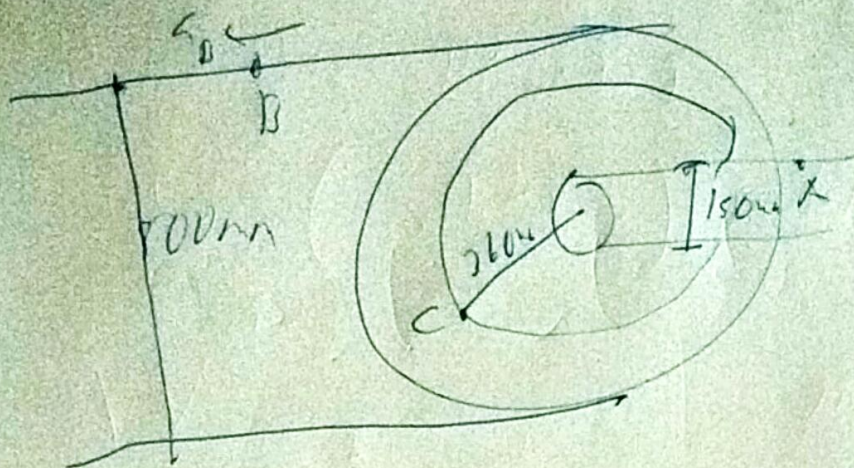
$$\alpha = \frac{d\omega}{dt} = 10 \text{ rad/s}^2 = 8.6 \text{ rad/s}^2$$

$$a = \sqrt{(r\alpha)^2 + \left(\frac{v^2}{r}\right)^2}$$

$$a = 11.755 \text{ m/s}^2$$

$$a = 11.8 \text{ m/s}^2$$

Question 2:



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$$V_A = 2.3 \text{ m/s}$$

$$a_B = 6.5 \text{ m/s}^2$$

find a_C

$$r_C = 0.36 \text{ m}$$

$$r_A = 0.73 \text{ m}$$

$$r_B = 0.4 \text{ m}$$

$$r_C = 0.36 \text{ m}$$

$$\omega_A = \frac{V_A}{r_A} = 30.667 \text{ rad/s}$$

$$r_B \omega_B = r_A \omega_A$$

$$\omega_B = \frac{r_A \omega_A}{r_B} = 5.75 \text{ rad/s}$$

$$\omega_C = \frac{r_A \omega_A}{r_C} = 6.389 \text{ rad/s}$$

$$a = \sqrt{a_n^2 + a_t^2}$$

$$a_{Bn/s} = \sqrt{\left(\frac{V_B^2}{r_B}\right)^2 + (r_B \alpha)^2}$$

$$V_B = 23 \text{ m/s} = V_C$$

$$\alpha = 189.101 \text{ rad/s}^2$$

$$a_C = \sqrt{\left(\frac{V_C^2}{r_C}\right)^2 + (r_C \alpha)^2}$$

$$a_C = 59.131 \text{ m/s}^2$$

$$a_C = 59.1 \text{ m/s}^2$$

8
 1824/2023
 E22
 Gray
 1824/2023

Question 3:

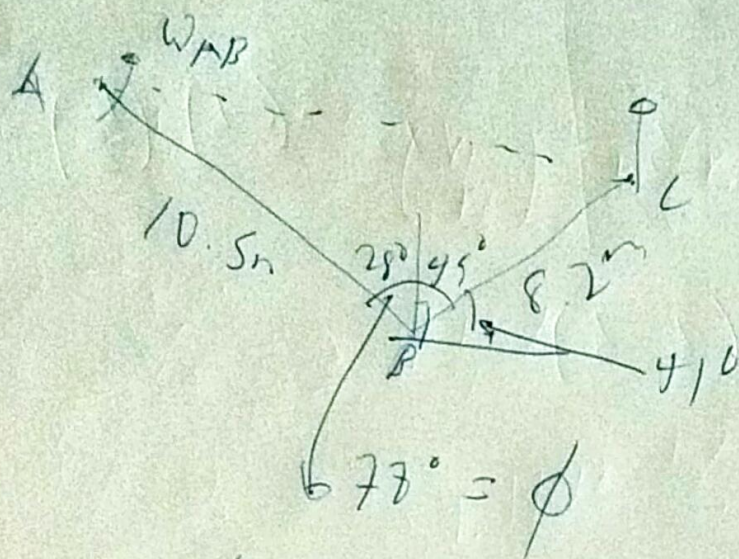
$$\overline{AB} = 10.5 \text{ m}$$

$$\overline{BC} = 8.2 \text{ m}$$

$$\theta = 41^\circ$$

$$\phi = 28^\circ$$

find ω_{AB} if $V_C = 36 \text{ m/s}$



cosine law:

$$\overline{AC} = \sqrt{\overline{AB}^2 + \overline{BC}^2 - 2\overline{AB}\overline{BC}\cos\phi}$$

$$\overline{AC} = 11.779 \text{ m}$$

$$\omega_{AC} = \frac{V_C}{\overline{AC}}$$

$$\omega_{AB} = \frac{V_C}{\overline{AB}} = 3.43 \text{ rad/s}$$

$$\omega = 3.036 \text{ rad/s}$$

$$\omega = 3.06 \text{ rad/s}$$